Rail Accident Investigation Branch

# RAIB Bulletin 05/2013

## Track worker struck and seriously injured at West Drayton, 22 March 2013

### Description of the accident

1 At around 10:37 hrs on Friday 22 March 2013, train 2P38, the 09:07 hrs First Great Western service from Oxford to London Paddington, was travelling between West Drayton and Hayes & Harlington, when it struck and seriously injured a track worker. The track worker was acting as a lookout[1] responsible for warning a group of other track workers when trains approached from the Hayes & Harlington direction. The lookout had his back to the train which struck him and he was not standing clear of the line[2] (his right foot was approximately 0.5 metres from the nearest rail).

### Sequence of events

2 The accident took place about 0.9 miles (1.5 km) from West Drayton station in an area where there are four tracks. From the north to the south these are named the Up Relief[3], Down Relief, Up Main and Down Main (figure 1). The up lines are used by trains travelling from West Drayton towards Hayes & Harlington and London; the down lines are used by trains heading in the opposite direction. A site yard lies adjacent to the Up Relief line and allows access to the railway line close to the area where the work was being carried out. This work required people to work on both the Up and the Down Relief lines.

3 The track workers included three members of staff undertaking survey work and six site safety personnel as described in paragraph 4. The Network Rail work planning process required a Safe System of Work (SSoW) pack to be produced. This pack is usually produced in advance of the work by a person known as a planner and aims to identify potential hazards and proposes a method of working that should keep track workers safe. Planners must select a SSoW from the hierarchy of safe systems of work. Types of SSoW are listed in the hierarchy with those seen as offering higher levels of protection from moving trains placed towards the top. Planners must select the highest (ie the most protective) SSoW type that they can, given the circumstances and nature of the work. A planner can only select a system from lower down the hierarchy (ie one which is less protective) after first considering the use of each of the higher types of SSoW.

[1] A person certified as competent to watch for, and give an appropriate warning of, approaching trains.

[2] If, as at this location, the maximum permitted linespeed is 100 mph or less, a position of safety is defined within GE/RT 8000 Module G1, Issue 4 as being at least 1.25 metres from the nearest line on which a train can approach.

[3] Relief lines are generally used by slower trains than those on the main lines.

4 On this occasion, the method of work proposed in the pack was that survey work should take place while train services were operating and that the survey team should stand clear of the tracks when trains approached. Prior to work taking place, the proposed method was reviewed and accepted by the Controller of Site Safety[4] (COSS) who then took responsibility for implementing and maintaining the safe system during the site work in accordance with the Railway Rule Book module HB7.

5 The COSS decided that on each side of the survey gang a distant lookout, positioned about 500 m away, should raise a warning flag when they saw an approaching train. In response to this raised flag, an intermediate lookout, positioned between the distant lookout and the survey gang, would raise their own flag and this would be seen by a site lookout positioned close to the survey gang and responsible for giving a warning to these people. These arrangements met the requirements of the Rule Book HB3. The COSS identified approximate locations along the railway based on the permissible speed and visibility of approaching trains where each lookout could carry out their duty while standing in a position safe from passing trains. The intermediate lookout at the London end of the site was to stand clear of the track on the northern side of the Up Relief line in an area at the side of the track known as the 'cess'.

6 The COSS added details of the lookout arrangements to the SSoW pack and briefed the survey staff and lookouts. All staff then signed the SSoW pack record sheet to acknowledge that they had received a briefing and that they understood its contents. These actions were in accordance with Rule Book module HB7.

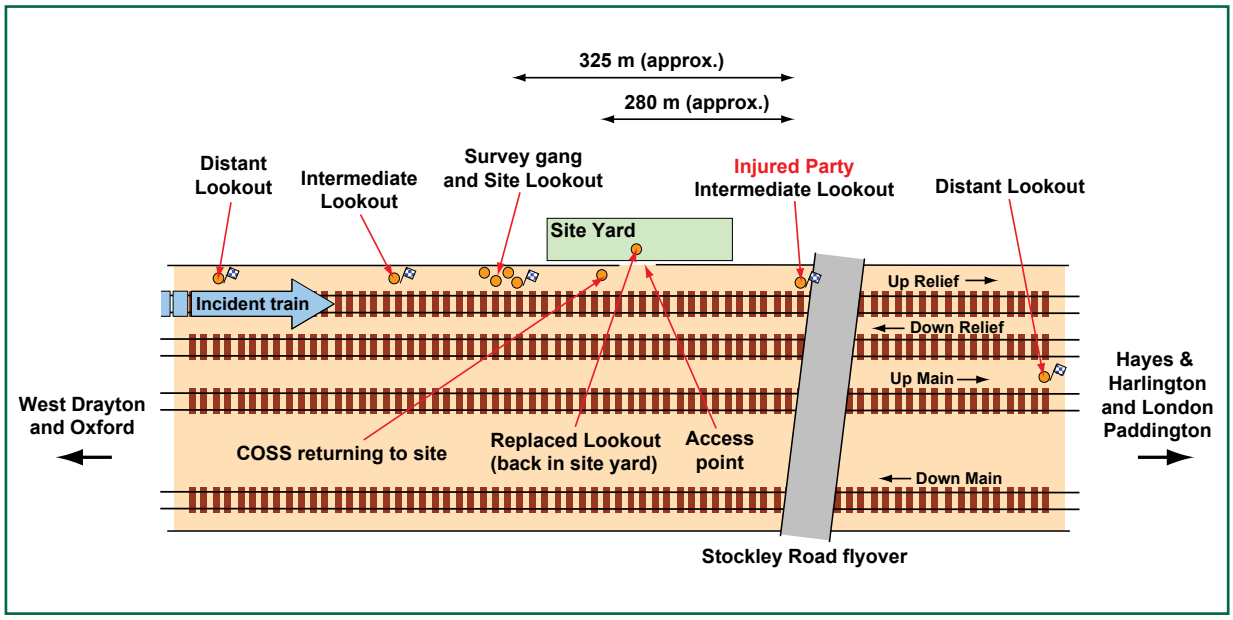


*Figure 1: Positions of track workers at the time the incident train passed through the site*

7 The COSS tested the means of protecting the staff by timing the warning given when trains approached the site. When satisfied that the warning time given was sufficient to allow the site staff to reach a position of safety at least ten seconds before the train arrived, the COSS allowed the survey work to commence.

[4] A person certified as competent to provide a safe system of work for activities being carried out by a group of persons on Network Rail railway infrastructure.

8 While the survey work was being undertaken, the COSS made a decision to changeover the intermediate lookout nearest to London. The work was stopped by the COSS who told the survey group and site lookout to move to, and remain in, a position of safety. Both distant and both intermediate lookouts remained at their posts while the COSS obtained a replacement lookout.

9 The COSS was aware that another person qualified as a lookout was working in a group in the adjacent site yard. The COSS approached the group and asked the qualified person to replace the intermediate lookout at the London end of the site.

10 There is conflicting witness evidence regarding how the lookouts were exchanged and whether any briefing was given to the replacement lookout by the COSS. However, the replacement lookout did sign the SSoW record sheet.

11 The replacement lookout was directed by the COSS to walk from the access point at the yard and exchange places with the intermediate lookout at the London end of the site. The COSS followed the replacement lookout as he walked alongside the track and there was a short exchange of words between the three men at the location of the lookout who was to be relieved.

12 The COSS and the original lookout then walked back to the yard. At the same time, the replacement lookout walked a short distance towards London from the position occupied by the original lookout. In this location close to the Up Relief line and facing the London end distant lookout (as he was required to do), he was standing with his back to trains travelling on the Up Relief line.

*Figure 2: Injured Party standing beside the track immediately before the accident (image from train FFCCTV)*

13 At about this time, the train involved in the accident left West Drayton and accelerated towards the permitted linespeed of 90 mph (145 km/h). Approximately 22 seconds after leaving West Drayton the train driver sounded a warning on the horn, as required by the Rule Book (paragraph 28), which was recorded by the on train data recorder[5] (OTDR).

14 A recording from the forward facing closed circuit television (FFCCTV) on board the train shows another work group adjacent to the Down Main line at this location, it also shows the incident (survey) group to be obscured from the driver's view by an overbridge at this time.

15 It cannot be determined from the available evidence whether the driver sounded a second warning (paragraph 29) or whether the distant and intermediate lookouts on the Oxford end of the site responded to hearing the first group's warning. The FFCCTV recording is not continuous because of an intermittent recording fault and it did not capture any acknowledgement from the distant lookout on the Oxford side of the site. The FFCCTV recording restarted just before the train passed the distant lookout and shows that he was aware of the approaching train. The recording also captures the intermediate lookout on the Oxford side and the survey gang raising their arms to acknowledge their awareness of the approaching train.

16 Data from the OTDR shows that the train passed the survey staff while travelling at approximately 56 mph (90 km/h). Because the COSS had not yet authorised them to restart work, the site lookout and survey group were still in a position of safety. Less than one second later the train passed the COSS who was returning to the survey group.

17 Approximately 9 seconds after passing the COSS the train driver realised that the intermediate lookout was standing too close to his track and reached to sound a warning on the train horn. It is uncertain whether the horn actually sounded (paragraph 29). At the same time the driver made a full service brake application.

18 Approximately 11 seconds after passing the COSS, the train struck the intermediate lookout from behind and on the right shoulder. He was pushed forwards and away from the line and suffered serious injuries as a result. The driver heard his train make contact with the lookout and approximately 3 seconds later the OTDR recorded a full emergency brake application. The train stopped and the driver made an emergency call on his radio before making his way on foot to the injured lookout.

## RAIB investigation

19 The RAIB identified inconsistencies between the paperwork filled in by the COSS and site activities. However, these did not contribute to the accident.

20 The injured party was first qualified as a COSS in 2008. He had undertaken COSS duties at the accident location and applied a similar safe system of work on at least one previous occasion in the week of the accident. He stated that he was aware that all lines were open to traffic and knew the permitted speeds and the directions that trains would approach from.

[5] An on board data device recording specific driver control positions and indications as well as train performance and critical system parameters.

21 The SSoW briefing record acknowledgement was signed by the injured party, but there is conflicting witness evidence as to whether he was given a full site safety briefing before starting work. His previous experience in the role of COSS at this location meant that, even if no formal briefing took place, the injured party was aware of the likely content of such a briefing. This may have given sufficient confidence for him to sign a briefing acknowledgement, and for the COSS to accept the signature without a specific briefing being given.

22 The COSS had identified a location along the track where the lookout could undertake his duty safely in accordance with Network Rail procedures. The COSS did not explicitly demonstrate to the intermediate lookout how far he should stand from the track. However, the rules governing the work of intermediate and distant lookouts clearly state that they should always stand in a position of safety.

23 The lookout had not anticipated being required to undertake safety critical duties that day and was transferred, with little warning, from an environment that he perceived to be less hazardous in the yard, to the role of lookout on track. The injured party has stated that while in the yard, he had been using his mobile phone to try and resolve some non work-related issues. He continued to think about these issues when deployed as a lookout.

24 The injured party was an experienced lookout and has stated that he would normally undertake lookout duties with his flag unrolled and held in his right hand, standing at a slight angle to the track to allow an occasional look behind.

25 FFCCTV images taken from the train moments before the accident shows the injured party looking towards London with his body at a near right-angle to the track while holding his flags rolled together in his left hand (figure 2). In this position he was facing directly away from trains approaching on the adjacent Up Relief line. This difference from his normal working practice could indicate that he had not fully engaged with the duties of a lookout.

26 The injured party understood that his position of safety was in the cess at least 1.25 metres from the nearest rail. He did not stand in this position, probably because he was not concentrating on his lookout duties.

27 Witness evidence shows that the injured party's mobile phone was found on the trackside immediately after the accident in a position indicating it was probably in his hand when he was struck by the train. The injured party cannot recall events immediately before the impact and could not positively account for the location of his mobile phone when he was struck.

28 Telephone records show that the mobile phone sent and received a small amount of data during the time the lookout was on the track. It has not been possible to identify whether this data was messaging, internet data or passive background updates of the device without the owner's intervention. The same records do show the device was not used for voice calls during this period. Although it is possible that the lookout checked his mobile phone while on track, no other trackworkers recalled seeing the lookout using his phone and the telephone records indicate little or no interaction with the device. Although use of mobile phones is likely to act as a distraction to users, there is no definitive evidence that this was a significant factor in the lookout not realising he was standing in an unsafe position.

29 The Rule Book, module TW1, requires that a train driver should sound a warning to anyone on or near the line on which they are travelling. The driver should give a series of short, urgent danger warnings to anyone who does not acknowledge the first warning by raising their arm or if anyone does not move clear of the train.

30 It has not been possible for the RAIB to determine exactly when, or if, the horn of the train involved in the accident was sounded in a position where it could have warned the injured party about the approaching train. Post accident testing of the train by the RAIB showed that the OTDR did not reliably record all horn blasts because it is possible to move the operating lever far enough to sound the train horn, but not far enough to operate the OTDR input switch. Witness evidence and earlier RAIB testing on a similar horn[6] shows that this is a typical characteristic of the type of train involved in the accident.

31 The intermediate lookout was unlikely to hear the warning sounded shortly after leaving West Drayton (paragraph 12) as the train was approximately 1.3 km away from the lookout at that time. If the horn was sounded a second time for the survey group (paragraph 14), it is still possible that he did not hear it as the train would have been approximately 1 km away.

32 The other members of the work group were aware of the approaching train (paragraph 14), but the intermediate lookout did not give any acknowledgement to the driver. It is possible that a loss of concentration, due to his preoccupation with non-work related issues, impaired the intermediate lookout's ability to register and/or react to the train's warning horn.

33 The driver was aware that the lookout had not acknowledged the approaching train, but did not sound an urgent warning because the lookout appeared to be clear of the line.

34 The train was on a curved section of track as it approached the injured party and in these circumstances it can be difficult for a driver to be certain whether somebody is clear of the track until the train is close to that person[7] (figure 3). The FFCCTV recording does not show the lookout moving into an unsafe position so it is probable that he was already in this position before the train approached. As the train travelled around the right-hand curve it would be difficult for the train driver to judge the clearance between the track and the injured party's position on the left-hand side of the track.

35 The train driver states that he sounded a low tone horn blast as he applied the brake. The brake application was recorded by the OTDR approximately 2 seconds before the train reached the injured party.

36 A single control lever operates both the low tone and a high tone blast. Section 10.2 of the Railway Rulebook module TW1 states that where an urgent warning is given this should be the loud or high tone as a series of short sharp horn blasts. The driver stated that the horn control position makes it quicker to sound a low warning tone and he felt that he did not have time to sound the high tone or urgent warning.

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[6] RAIB report 04/2008, Track Worker Fatality at Ruscombe Junction.

[7] The fact that it is difficult for drivers to judge the position of track workers relative to the track on such curves was also identified in the RAIB's investigation into a fatal accident involving a lookout at Whitehall West Junction (RAIB report 15/2010) and was subsequently highlighted in the industry wide safety briefing 'Red Alert' (issue 40).

*Figure 3: Injured party seen from some distance away on the curved approach*

37 Neither the injured party nor the other trackworkers recall hearing a horn blast after the train had passed the survey team. The COSS was the nearest person to the injured party and did not recall hearing the horn while returning to the survey team, but he may have been unable to hear due to the noise of the train passing him. The FFCCTV showed no indication of the lookout responding to a horn blast.

## Use of horns and acknowledgement of warning by track workers

38 First Great Western has raised concerns that track workers between Reading and London Paddington had not been acknowledging warnings given by approaching trains. The industry panel formed to investigate this accident also raised a concern regarding the effectiveness of train warnings where large numbers of track worker groups are working in close proximity to each other. The concern relates to the ability of the driver to warn and observe acknowledgments from several groups. It is also possible that a large number of warnings may be less effective, with track workers becoming accustomed to an environment filled with many horn blasts.

39 The RAIB does not consider the number of track workers in the vicinity of West Drayton to have been a factor in this accident. However, the RAIB has witnessed both members of work groups and lone track workers in the Reading to London Paddington area not acknowledging warnings from approaching trains. Other drivers state that this happens so often that they do not consider it appropriate to give an urgent warning every time.

## Previous accidents

40 The RAIB has previously investigated two accidents with factors similar to this incident (although neither is considered to be directly comparable). In April 2007 a track worker was struck and fatally injured by a train at Ruscombe Junction (RAIB report 04/2008). The track worker had acknowledged the warning blast but did not move clear of the line on which the train was routed. Despite this the horn was not sounded again. Consequently, the RAIB recommended that First Great Western re-brief its drivers on the need to sound short blasts if staff did not move clear of the line. In 2009, the Office of Rail Regulation (ORR) informed the RAIB that First Great Western had taken action in response to this recommendation.

41 In December 2009 a lookout was struck and fatally injured at Whitehall West Junction (RAIB report 15/2010) after he moved from a position of safety into a position too close to the line. Since it is probable that this happened because he became unaware of where he was standing relative to the track, the RAIB made a recommendation that Network Rail should consider ways of reducing the risk of lookouts moving dangerously close to the track. Network Rail reports that it has undertaken some research into lookout vigilance and location awareness and is considering whether to introduce any additional measures.

## Learning points

42 The RAIB has decided not to conduct a full investigation as it does not believe that an investigation would identify new safety learning. However, the accident illustrates the importance of applying existing safety knowledge, particularly the learning points given below:

a) Network Rail and other organisations engaged in activities involving work on the railway are advised, as part of their routine briefings, to remind their staff that:

- railway staff working on or near the line must focus on the task in hand and not be distracted by other thoughts or use of a mobile phone. If any staff feel that they cannot concentrate on this task, they must move to a position of safety and tell the person in charge that they cannot do the job safely and ask to be relieved; and
- when acting as a COSS, even when instructing an experienced co-worker, a full briefing must be given to everyone to give assurance that people are aware of the safe system of work and have fully engaged with implementing it; and

- while on or near the line, track workers must acknowledge any warning given by an approaching train so that the driver is better able to judge whether there is a need to sound an additional urgent warning.

b) Train operating companies are advised, as part of their routine briefings, to remind all drivers that:

- when sounding warnings to people on or near the line, they should pay particular attention to lookouts and other staff who may be remote from a main group; warnings should start with a blast on the high and the low tone horn (in the loud setting where soft or loud settings are provided), followed by short sharp blasts where no acknowledgement is received or the track worker remains in a dangerous position; and
- train drivers approaching track workers in areas of curved track should appreciate that it can be difficult to see whether these people are in a position of safety until they are close to the individual concerned. If there is any doubt a warning should be sounded.

c) Train operators should endeavour to improve the availability and quality of forward and rear facing closed circuit television recordings because this assists in the evidence gathering needed for safety learning.

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Any enquiries about this publication should be sent to:

RAIB
The Wharf
Stores Road
Derby UK
DE21 4BA

Telephone: 01332 253300
Fax: 01332 253301
Email: enquiries@raib.gov.uk
Website: www.raib.gov.uk